3.0 ALTERNATIVES

3.1 DEVELOPMENT OF ALTERNATIVES – INTRODUCTION

The Alternatives Chapter in the DEIS was accompanied by an Alternatives Analysis Technical Appendix that provided additional information. The Alternatives Chapter in the subsequent SDEIS was expanded to provide more details regarding the alternatives considered for project implementation. This FEIS provides a summary of the alternatives data. The SDEIS should be referenced for the more detailed information regarding the alternatives considered to date. The SDEIS can be found online at the following location: (http://www.rivervalleyintermodal.org/deis.htm).

The ARV project area consists of six counties in central Arkansas: Conway, Johnson, Logan, Perry, Pope, and Yell. There are currently three public ports/terminals along the Arkansas portion of the MKARNS located in Pine Bluff, Little Rock, and Fort Smith. There are no public use facilities within 30 miles of the project area, however there are three private docks within 30 miles of the project area including the following: Pine Bluff Sand & Gravel, the Port of Dardanelle; and Oakley Port. None of the ports within 30 miles contain a slackwater harbor.

For purposes of the alternatives analysis the geographic limits of the proposed project area within the six-county ARV region extended from Highway 109, located just west of Clarksville, to Highway 9 near Morrilton. The proposed intermodal facilities would be located within an area with suitable access to a slackwater harbor, the national railroad grid, and the interstate highway system.

- **Slackwater Harbor**. Access to the MKARNS via a slackwater harbor on the Arkansas River with dockside loading and unloading capabilities is an important element of the proposed facilities. This would provide a connection to the Tulsa Port of Catoosa in eastern Oklahoma via the Arkansas and Verdigris Rivers and would provide a connection to the Mississippi River system, thus allowing ready access to the U.S. inland waterway system.
- **Railroad.** Access to the national railway grid would be provided through the Class I UPRR and/or through other existing connector lines such as the Class III short line DRRR.
- **Highways.** The Intermodal Facilities project would also include local access to I-40 via connections through existing local highways.

Additional services at the intermodal facilities would include on-site railcar/truck transfers, truck/barge transfers, railcar/barge transfers, freight tracking, a foreign trade sub-zone, warehousing, distribution, consolidation, just-in-time inventory services, and material storage capabilities.

The identification, consideration, and analysis of alternatives are key to the NEPA process and goal of objective decision-making (FHWA, 2006). Consideration of alternatives leads to a solution that satisfies the transportation needs and protects

environmental and community resources. As stated in 40 CFR 1502.14, the CEQ requires agencies to:

a) Rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated.

b) Devote substantial treatment to each alternative considered in detail, including the proposed action, so that reviewers may evaluate their comparative merits.

c) Include reasonable alternatives not within the jurisdiction of the lead agency.

d) Include the alternative of no action.

e) Identify the agency's preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternative in the final statement unless another law prohibits the expression of such a preference.

f) Include appropriate mitigation measures not already included in the proposed action or alternatives.

Beyond the CEQ requirement of evaluating all or a reasonable number representative of the full spectrum of reasonable alternatives, there are other requirements for analyzing alternatives. These requirements fall under Section 4(f), the Executive Orders (EO) on Wetlands and Floodplains, and the Section 404(b)(1) guidelines (FHWA, 2006).

The use of land from a Section 4(f) protected property (such as a significant, publicly owned park, recreation area, or wildlife and waterfowl refuge, or any significant historic site) may not be approved unless a determination is made that there is no feasible and prudent alternative for such use. Many factors exist that could render an alternative "not prudent," including cost and environmental impacts. If an alternative does not meet the action's purpose or need, then the alternative is typically not prudent, and it should not be included in the analysis as an apparent and reasonable alternative (FHWA, 2006).

Due to the nature of this project, there were no reasonable alternatives identified that would be considered outside of the jurisdiction of the FHWA. No matter who builds intermodal facilities like those proposed, the FHWA would have some jurisdiction due to the eventual connection of the facilities with highways under at least partial FHWA jurisdiction.

A preferred alternative was not identified as part of the DEIS or SDEIS, but the Russellville Bottoms or Green Alternative has been selected as the preferred alternative in this FEIS. The preferred alternative was selected after analysis of impacts had been conducted for all reasonable Build Alternatives and the No-Action Alternative discussed in the DEIS and SDEIS. Detailed mitigation measures for the proposed action will be developed primarily during the permitting stage of this project. The Authority will work directly with the regulatory agencies responsible for the various resources that would be impacted by the intermodal facilities.

3.2 ALTERNATIVES ANALYSIS STUDY

3.2.1 Alternative Screening Criteria

A full range of potential project alternatives was considered during the development of the RVIF DEIS and SDEIS. Objective screening criteria were developed cooperatively with input from FHWA, USACE, the Authority, AHTD, and the public to help identify potential reasonable alternative locations for the project. The screening criteria were reviewed by various agencies during a January 26, 2005 agency coordination meeting in Little Rock, Arkansas, at an agency alternatives analysis review meeting on March 15, 2005, and by the public at a March 15, 2005 Public Informational Meeting. The screening criteria were further refined in the SDEIS based on additional information gathered for all of the potential sites being considered and due to additional comments from various agencies and the public following the review of the DEIS.

The screening criteria were established to facilitate the selection of an alternative or alternatives for detailed evaluation that would meet the purpose and need of the project, could be constructed in a cost effective manner, and would minimize adverse impacts to human, environmental, and cultural resources. The basic purpose and need is to promote economic development and create additional jobs in the ARV region. This is proposed to be accomplished by developing intermodal facilities that interconnect three modes of transportation (truck, train, and barge) at one continuous site that is large enough to allow the necessary infrastructure for all three modes of transportation to be juxtaposed with ancillary facilities. The desired site would contain land suitable for development, be proximate to existing communities and infrastructure, and provide enough space to attract a combination of large and small industrial developments within the site. Table 3.1 lists the screening criteria and rationale that were utilized to evaluate the various alternatives developed for the project and to determine which of the alternatives should be evaluated in detail in the SDEIS.

Table 3.1. Screening Criteria Utilized to Identify Reasonable Alternatives to be Considered in the Arkansas River Valley Environmental Impact Statement.	
1	The alternative must provide reasonable intermodal facilities access (i.e., proximate to highway, rail, and river access).
2	The alternative layout should be contiguous to allow the various modes of transportation to be juxtaposed (i.e., all of the modes must fit on one site along with the ancillary facilities).
3	Site should be positioned near the navigable channel of the Arkansas River
4	The minimum size for the alternative should be at least 700 acres and the optimum size would be >800 acres. This is based upon the an estimate of 200 acres for the slackwater harbor, 200 acres for the truck transfer/off-loading area, 200 acres for the railroad facilities, and 200 acres for the ancillary facilities and industrial development.
5	The alternative should minimize impacts to the human environment by minimizing the number of relocations required and minimizing exposure of facilities' operations to adjacent residences.
6	The alternative should be close to existing industry to facilitate and maximize the use (and associated benefits) of the facilities.
7	The alternative should minimize impacts to natural resources by minimizing impacts to wetlands and perennial and intermittent streams.
8	The alternative should minimize impacts to flood levels for properties located adjacent or downstream of the site.
9	The alternative should minimize impacts to cultural resources.
10	The alternative should be proximate to existing communities in order to supply a suitable workforce and proximate to existing utilities and infrastructure to reduce initial site development costs.
11	The alternative should have land and topography suitable for the development of the required facilities infrastructure
12	Planning level development costs should reasonable compared to currently available funds of approximately $7,000,000.
13	The alternative site should be conducive to reasonable site operations and maintenance costs

In general, an alternative site was considered more likely to promote economic development and job creation, and therefore meet the purpose and need, if it:

- was located adjacent to existing transportation infrastructure (highway, rail, and river access) to allow for reasonable multi-modal access (screening criterion #1);
- provided a contiguous site that allowed for all three modes of transportation to be juxtaposed with the ancillary facilities, such as on-site transfer areas, temporary storage areas, warehousing, and industrial development (screening criterion #2);
- was at least 700 acres in size to allow adequate space for the required infrastructure and ancillary facilities while allowing adequate space to facilitate the development of

potential industries, some of which may require large areas for production, storage, and shipping of their products (screening criteria #4); and

- consisted of land suitable for development of required facilities and infrastructure [i.e., majority of site with less than 5% slope gradient (screening criterion #11)].

In summary, alternative sites were evaluated using the 13 screening criteria. Based upon the screening level analysis, alternatives that best fit the screening criteria were selected for detailed analysis in the EIS.

3.2.2 Other Alternative Analysis Considerations

The project area lies in the ARV (Quaternary Alluvium) between the Ozark Mountains physiographic region (Atoka Formation, Cane Hill Member of the Hale Formation, and Hartshorne Sandstone) to the north and the Ouachita Mountains physiographic region to the south (Atoka Formation). The geologic features, formations, and steep topography of the surrounding area limit the development potential of much of the ARV region. As such, many undeveloped tracts in the project area would not be suitable for development of the large intermodal facilities complex. According to the Arkansas Valley Alliance for Economic Development, there is a lack of developable land in the ARV capable of supporting future industry (AVAED, 2007 and Pipkin pers. comm., 2010).

The Holla Bend National Wildlife Refuge (NWR), which is managed by the U.S. Fish and Wildlife Service (USFWS), is located in Yell and Pope Counties south of the Arkansas River between ARM 196.5 and 193.9. During the agency and public involvement phase of the DEIS and SDEIS, the USFWS, conservation organizations, and citizens expressed concerns over the juxtaposition of the intermodal facilities and the NWR. The USFWS would oppose alternatives that could adversely impact the mission of the NWR (Wine pers. comm.), which is primarily to provide habitat for migratory birds (http://www.fws.gov/southeast/HollaBend/). When selecting a site for the intermodal facilities, the approach of “the farther away, the better” was suggested by the USFWS and concerned citizens. Although an exact minimum distance from the NWR was not specified by the USFWS, they have concurred that the sites proposed in the DEIS and further defined in the SDEIS would not adversely impact Holla Bend NWR. The USFWS would oppose alternatives similar to the Holly Bend or Dike Field alternatives presented in the Russellville Slackwater Harbor EA that was prepared by the USACE. These alternatives were dismissed in the EA, because they were situated in ecologically important wetlands, they were located near the Galla Creek State Wildlife Management Area, and they would not be cost effective due to the extensive infrastructure development costs (USACE, 2000).

Railroads are typically constructed on land with less than two percent slope and preferably on land with one percent or less slope gradient (USACE, 2000a). The additional force required to move a train, due to the presence of a grade, is known as grade resistance. Grade resistance equals 20 pounds for each ton of train weight and percent of grade. Thus, it takes twice the force to pull a train up a 2-percent grade as it does a 1-percent grade. For this reason, the choice of maximum gradient (the rate of

elevation change on a particular grade) can have a great effect on operations over a route (USACE, 2000a). Therefore, sites with greater than 5 percent slope would not support reasonable rail access.

3.2.3 Analysis of Potential Alternatives

A total of nine potential alternative locations for placement of the intermodal facilities were identified within the geographic limits of the six-county ARV region during January through April 2005. No additional sites were identified during the agency scoping meeting. One of the nine sites was identified following public comments received at a March 15, 2005 Public Informational Meeting associated with the DEIS.

At its nearest point the distance to existing railroad lines on the south side of the Arkansas River was greater than 8 miles, and buying railroad right-of-way and constructing a new railroad line was not considered financially reasonable. There would also be a great deal of environmental, land use, and social impacts associated with the construction of a new railroad line. It was also not considered reasonable to construct a railroad bridge across the Arkansas River to provide railroad access. A bridge would not be reasonable or feasible based upon anticipated environmental impacts and extreme costs. Therefore, no sites south of the Arkansas River were considered reasonable for the proposed facilities.

Sites that contained extremely steep terrain near the river that would inhibit access to the Arkansas River were not considered reasonable. Other sites that were considered during the initial identification of potential alternative sites, such as the existing Port of Dardanelle, were not carried through the entire alternative screening process due to known limitations of the site to provide all the necessary features required of the proposed intermodal facilities. Such sites would not be practicable for the development of rail facilities or other ancillary facilities due to terrain, available vacant land, or other constraints. For instance, expanding the existing Port of Dardanelle was not considered a reasonable option due to constraints (e.g. lack of vacant land) at that site that would limit development of ancillary facilities necessary for fully functional intermodal facilities (e.g. industrial development area). Substantial impacts to Whig Creek would be required, if the Port of Dardanelle were to be expanded to allow construction of the large intermodal facilities complex that is proposed to be developed on a contiguous tract of property. In addition, one of the important aspects of the proposed intermodal facilities is to provide a slackwater harbor to allow barges to pull out of the main channel of the river for safer transfer of freight. The area required for the slackwater harbor along with ancillary facilities would exceed that available at the existing Port of Dardanelle location.

Sites that would require dredging an extensive canal (>0.25 miles in length) over land from the navigable channel of the river were not considered reasonable. Although it would be possible to dredge a canal to connect such sites to the river, the potential for increased environmental impacts, additional construction and maintenance costs, and safety and operational problems of a long narrow canal make it undesirable and unreasonable. Increased environmental impacts of constructing a long canal may include impacts to wetlands by disrupting hydrology, increased soil disturbance and erosion potential, and loss of wildlife habitat mainly associated with the loss of wetlands.

In addition, no plans for an airport facility are considered as part of this project.

The following nine alternatives for the proposed action, listed from upstream to downstream, were considered in the DEIS and SDEIS:

- Pittsburgh Road (Yellow);
- Bend (Purple);
- Keener Cove (Blue) (identified during the public involvement process);
- New Hope (Pink);
- North Dardanelle (Red);
- Russellville Bottoms (Green);
- Atkins Bottoms (Orange);
- Blackwell Bottoms (Black); and
- Morrilton Bottoms (Brown).

Figure 3.2 shows the general location of each of the potential alternatives that were considered for inclusion in the DEIS. The alternative sites were investigated in January through April 2005, with some additional analysis in June 2007 for the SDEIS. No additional alternative sites were identified or suggested by the public or other agencies that would be considered reasonable. One DEIS commenter provided additional information including a site layout to support his proposal to consider the Keener Cove site as a reasonable alternative. However, after evaluating the proposal, this site would not be considered reasonable. In addition, several DEIS commenters suggested that there were other sites to consider and either used the "anywhere but here" approach, or an approach that did not correlate with the accepted screening criteria. In all cases the commenters were unable to identify a reasonable site that met the screening criteria and could be investigated.

3.3 SUPPLEMENTAL DATA USED IN THE ALTERNATIVE ANALYSIS DECISION-MAKING PROCESS

Planning level cost estimates for new primary intermodal facilities access roads and rails were developed for each of the nine potential alternative sites listed above. These estimates included costs for new primary access roadways and rails that would connect existing state highways and railroads to the potential slackwater harbor site of each alternative location. These estimates do not include all roadways and rails that would need to be established to create a completely functional intermodal facilities complex. The main roadway and rail cost difference between the alternative locations would be primarily due to construction of the mainline access road and rail alignment, because the access lengths vary for each alternative.

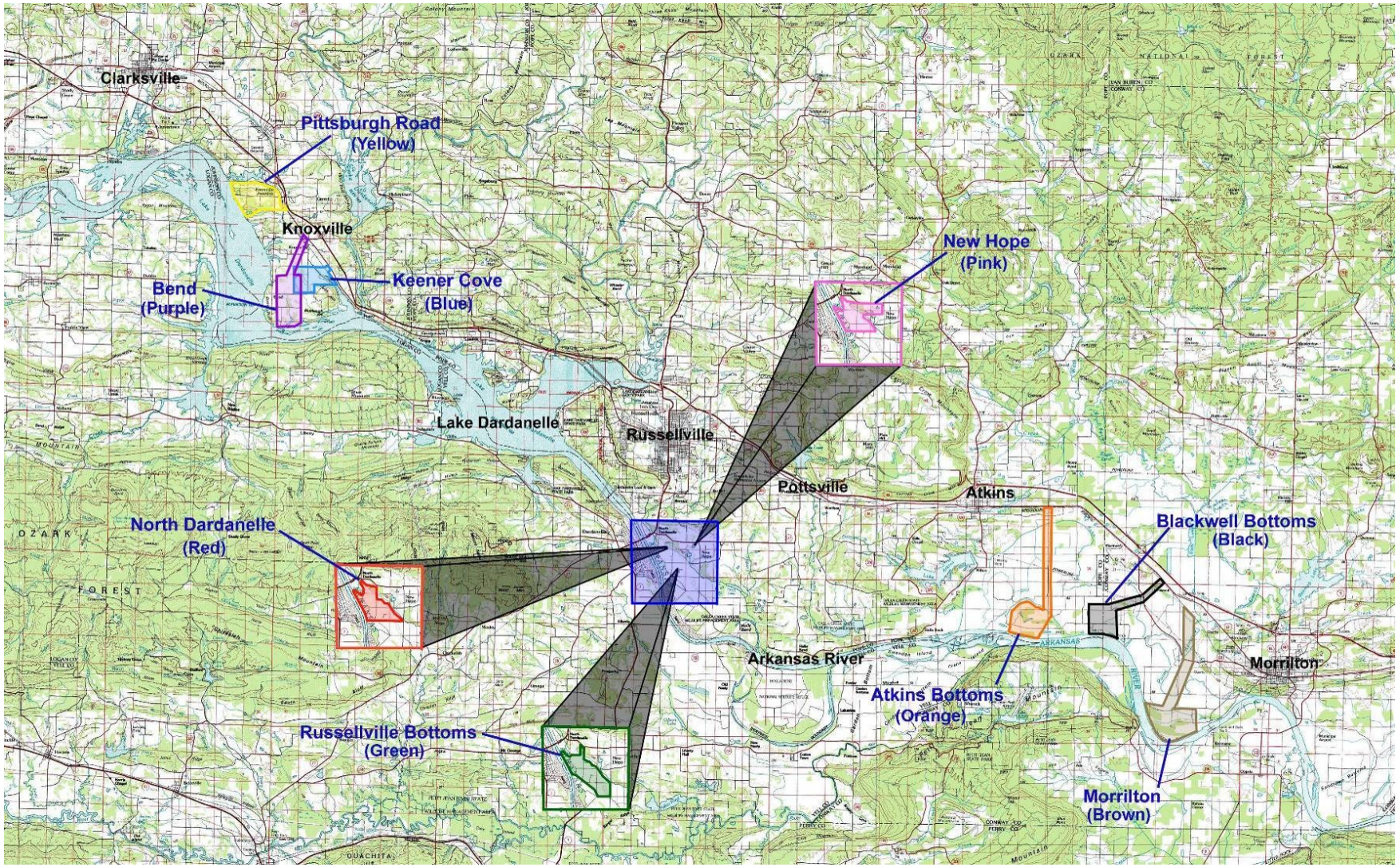
To estimate the costs of the slackwater harbor construction several general assumptions were made. It was assumed that the depth for harbor and access channels would be 14 feet (USACE, 2001) to be compatible with the approved

Arkansas River 12-foot navigation channel. The entrance channel into the harbor would be 450 feet wide to allow for passing, and the harbor would be 15-20 acres (excluding the entrance channel). Therefore, the overall footprint of the harbor would be approximately 30 acres.

Providing each of the alternative sites with utilities such as water, electricity, communications, sewer, and gas were analyzed qualitatively based on the location of each site in relation to existing utility infrastructure. Assumptions were made that sites that are located further from existing utilities would cost more than proximate sites, and utilities would be more difficult to provide for distal sites.

Proximity and number of existing industries in relation to each potential Build Alternative were considered in the SDEIS. There are approximately 123 industries in Conway, Johnson, Logan, Perry, Pope, and Yell Counties that could potentially use a new intermodal facilities complex (Harris Infosource, 2008). Many of these industries ship bulk commodities, such as grain, rock, steel, fertilizers, or wire that can be transported by barge at a less expensive rate, or they would ship their finished products to foreign markets via water transportation. Establishing the new intermodal facilities proximate to existing industries would be a considerable attraction for these industries to stay and/or expand their business in the region.

Figure 3.1. Overview Map of Alternative Locations Considered for Inclusion in the River Valley Intermodal Facilities EIS.



3.4 SUMMARY OF FINDINGS OF THE ALTERNATIVES ANALYSIS STUDY

An alternatives analysis matrix is provided on Table 3.2. This table contains a comparison summary of how well each of the potential Build Alternatives considered in the Alternatives Analysis Study conformed to the alternative screening criteria.

The three alternatives that were evaluated in the SDEIS included the Green Alternative (Preferred Alternative), Red Alternative, and Purple Alternative. These alternatives met the screening criteria and were considered reasonable alternatives for project implementation. These alternatives were carried forward and fully evaluated in the SDEIS, based upon the following factors:

- The Green and Red Alternative sites would provide reasonable multi-modal access, because they are proximate to existing highways, railroads, and the navigation channel of the Arkansas River. The Purple Alternative site is moderately close to existing railroad and highway alignments and to the navigation channel of the Arkansas River.
- Relative to some of the other potential alternatives, there would not be severe impacts to the human environment (i.e. residential relocations) from the Green, Red, or Purple Alternatives.
- The Green and Red Alternative sites are located proximate to existing communities, utilities, infrastructure, and industry. The Purple Alternative is moderately close to existing industries, but distant (6.6 miles) to communities with existing public utilities/infrastructure.
- Impacts to natural resources under the Green and Red Alternatives would be reduced compared to other similar alternatives. The Purple Alternative site has anticipated minimal adverse impacts to wetlands and floodplains, and moderate impacts to streams.
- There would be less potential for impacts to cultural/historical resources under the Purple Alternative than under most of the other alternatives.
- Over 90 percent of the Green and Red Alternative sites are suitable for development of ancillary facilities or rail access. Although approximately 63 percent of the Purple Alternative site is poorly suited for development of ancillary facilities and rail access due to the steep terrain and physical limitations, it is anticipated that through appropriate engineering design these limitations could be overcome.
- For the Green and Red Alternatives, the cost of the initial site development would be reasonable when compared to the currently available funds of approximately $7 million. The Purple Alternative's initial site development costs are moderate to high.
- The Green Alternative has low anticipated operations and maintenance costs and the Red, and Purple Alternatives have moderate anticipated operations and maintenance costs.

The Pink Alternative also met the screening criteria. However, while this alternative is quite similar in location and configuration to the Green and Red Alternatives, it has

substantially more residential relocations with severe local community impacts likely and more stream and wetland impacts than these other alternatives. Therefore, the Green and Red Alternatives were chosen for further evaluation over the Pink Alternative.

Direct impacts to the social environment, recreation, natural resources, cultural resources, and floodplains would be associated with those alternatives that were not selected for further evaluation (the Yellow, Blue, Pink, Orange, Black, and Brown Alternatives). There would be significant adverse impacts to the social environment under the Blue and Pink Alternatives due to 62 residential relocations. Over 7,500 feet of stream channel would be adversely affected under the Yellow, Blue, and Brown Alternatives, and adverse impacts to more than 40 acres of wetlands would occur under both the Orange and Brown Alternatives. Negative impacts to floodplains and to cultural resources would be severe under the Pink, Orange, Black, and Brown Alternatives. Sites located proximate to Galley (Galla) Rock and Point Remove Mounds, both areas known to contain potential important cultural resources, include the Orange and Brown Alternatives. Adverse impacts to recreation under the Blue Alternative would be associated with the planned Highway 64 Cove Park. The proposed intermodal facilities at the Blue Alternative would likely pose a constructive use to the proposed park due to the proximity of impacts of the project and their ability to severely diminish the activities, features, or attributes of this potential Section 4(f) property.

Beneficial direct social impacts at each of the alternatives that were not selected for further analysis would include enhanced economic functionality and viability of the project areas. New transportation and employment opportunities would be attained in the project areas. Other beneficial direct impacts would be similar to those of the Purple, Green, and Red Alternatives.

Indirect impacts would also be associated with the alternatives not selected for further evaluation. Loss of wetlands, stream channel alignments, and riparian buffers could result in reduced water quality for downstream areas of these alternatives. Long-term adverse indirect impacts to aquatic resources would occur from increased impervious surface area and conversion from rural to industrial use. Long-term beneficial indirect impacts would occur by eliminating the use of the project area for agriculture, especially cattle pastures and poultry operations. Runoff of fecal coliforms and chemicals from pastures and poultry operations into aquatic resources can adversely affect water quality. In addition, the intermodal facilities would provide a catalyst for the expansion of existing industry and attraction of new industry into the regions of these alternatives. Indirect impacts from the alternatives not selected for further analysis would be similar to those of the Purple, Red, and Green Action Alternatives.

Past actions have resulted in the current demographic, land use, and development trends in the region of the Intermodal Facilities. The baseline environmental condition is, in part, the result of these past actions.

Past, present, and future actions in the region include:

- Construction projects to provide typical urban improvement needs, such as roadway infrastructure, commercial development, and residential housing.
- Logistical and organizational activities (e.g. local travel) required for people to carry out everyday government, private sector, and personal functions.
- Alteration, repair, rehabilitation and maintenance of buildings, structures, site improvements, and utility systems, as required.

Cumulative impacts resulting from alternatives carried forward for further analysis would be associated with the Arkansas River Navigation Project, Highway 247 improvements, industrial development in the Arkansas River bottoms near Russellville, expansion of soil and gravel excavation and removal, continuation of agricultural land use, and the increase of existing Arkansas River commerce. Cumulative impacts from the alternatives not selected for further analysis could include soil erosion, air emissions, effects on traffic flow, changes in the noise environment, and socioeconomic changes and would be similar to those of the Purple, Red, and Green Action Alternatives.

Table 3.2. Summary of Alternatives Analysis for Potential Build Alternatives of the River Valley Intermodal Facilities

	Alternative Screening Criteria														
Alternative (RM = River Mile)	**Provides reasonable multi-modal access [distance to nearest State highway/ railroad (miles)]**	**Layout of site and intermodal nodes are contiguous**	**Site positioned near navigable channel of Arkansas River [distance to channel in (feet)]**	**Site is at least 700 acres in size (acres)**	**Number of Re-locations (# of Resi-dences)**	**Existing Industry Close to Site (# of Industries with 15 miles see Table 3.4)**	**Potential for impacts to natural resources (acres of wetlands)**	**Potential for impacts to natural resources [feet of stream channel, (perennial + intermittent)**	**Potential for impacts to flood-plains (% of site in floodplain)**	**Potential impacts to cultural/ historical resources (ratings described in section 3.2.1)**	**Distance of site to communities with existing public utilities/ infrastructure (distance to nearest public water/electric/ gas in miles)**	**Suitable land for development of required facilities/ infra-structure (% of land with 5% or greater slope gradient)**	**Estimated Planning level development costs (Costs further described in Table 3.2)**	**Anticipated Operations and Maintenance Costs (costs described in section 3.2.1)**	**Comments/ Issues**
Pittsburgh Road (Yellow) Alternative (RM 226)	1.7/1.6 Miles	Yes	5,737 feet	806	31	24	< 5 acres	8,038 feet	3%	Moderate	2.6 miles	87%	$25,759,400	High	Positive aspects include proximity to state highway/railroad, contiguous layout >700 acres, low number of relocations, minor impacts to wetlands and floodplains. Negative aspects include distance from navigable channel of Arkansas River, terrain too steep/rolling for rail development, clearing of large amount of forests, moderate planning level costs, and high operations and maintenance costs. Substantial stream impacts likely.
Bend (Purple) Alternative (RM 220)	3.5/3.0 Miles	Yes	1,688 feet	742	15	28	< 5 acres	6,748 feet	5%	Moderate	6.6 miles	63%	$27,399,900	Moderate	Positive aspects include proximity to state highway/railroad, contiguous layout >700 acres, moderately close to navigable channel, low number of relocations, minor impacts to wetlands and floodplains. Negative aspects include distance to existing utilities and infrastructure, steep terrain, and moderate planning level costs. Lake Dardanelle State Fish Hatchery in proximity.
Keener Cove (Blue) Alternative (RM 217.5)	1.0/0.5 Miles	Yes	7,248 feet	703	62	30	14 acres	7,709 feet	5%	Moderate	5.1 miles	35%	$30,461,600	High	Positive aspects include proximity to state highway/railroad, contiguous layout >700 acres, and minor impacts to floodplains. Negative aspects include distance to navigable channel of Arkansas River and existing utilities, high number of residential relocations, adverse stream channel impacts, moderate planning level costs, and high operations and maintenance costs. Planned Highway 64 Cove Park would be a potential Section 4(f) issue.
New Hope (Pink) Alternative (Old Alt. 2; RM 203)	1.0/1.1 Miles	Yes	0 feet	836	62	69	26 acres	5,100 feet	65%	High	0.8 miles	27%	$15,404,000	Moderate	Positive aspects include proximity to state highway/railroad, the navigable channel, to existing industry, and to existing utilities, contiguous layout >700 acres, low planning level costs. Negative aspects include high number of relocations that would require relocation of multiple businesses and residences. Stream and wetland impacts higher than similar Green Alternative. High potential for cultural/historical impacts.
North Dardanelle (Red) Alternative (Old Alt. 3; RM 203)	1.0/1.1 Miles	Yes	0 feet	832	8	69	21 acres	5,100 feet	96%	High	0.8 miles	6%	$15,330,000	Moderate	Positive aspects include proximity to state highway/railroad, to the navigable channel, to existing industry, and to existing utilities, contiguous layout >700 acres, low number of relocations, low planning level costs, wetland and stream channel impacts less than similar Pink Alternative, level terrain. Negative aspects include site is in floodplain and potential for cultural/historical resources issues.

Table 3.2 (Continued). Summary of Alternatives Analysis for Potential Build Alternatives of the River Valley Intermodal Facilities

Alternative (RM = River Mile)	Alternative Screening Criteria: Provides reasonable multi-modal access [distance to nearest State highway/ railroad (miles)]	Layout of site and intermodal nodes are contiguous	Site positioned near navigable channel of Arkansas River [distance to channel in (feet)]	Site is at least 700 acres in size (acres)	Number of Re-locations (# of Residences)	Existing Industry Close to Site (# of Industries with 15 miles see Table 3.4)	Potential for impacts to natural resources (acres of wetlands)	Potential for impacts to natural resources [feet of stream channel, (perennial + intermittent)	Potential for impacts to flood-plains (% of site in floodplain)	Potential impacts to cultural/ historical resources (ratings described in section 3.2.1)	Distance of site to communities with existing public utilities/ infrastructure (distance to nearest public water/electric/ gas in miles)	Suitable land for development of required facilities/ infra-structure (% of land with 5% or greater slope gradient)	Estimated Planning level development costs (Costs further described in Table 3.2)	Anticipated Operations and Maintenance Costs (costs described in section 3.2.1)	Comments/ Issues
Russellville Bottoms (Green) Preferred Alternative (RM 203)	1.0/1.1 Miles	Yes	0 feet	882	6	69	18 acres	414 feet	100%	High	0.8 miles	1%	$9,276,000	Low	Positive aspects include proximity to state highway/railroad, to the navigable channel, to existing industry, and to existing utilities, contiguous layout >700 acres, low number of relocations, low planning level costs, minor impact to stream channels, level terrain. Negative aspects include site is in floodplain and high potential for cultural/historical resource issues.
Atkins Bottoms (Orange) Alternative (RM 188)	5.9/6.7 Miles	Yes	0 feet	820	2	31	82 acres	6,419 feet	100%	High	4.5 miles	3%	$29,418,500	Moderate	Positive aspects include contiguous layout >700 acres, proximity to the navigable channel, low number of relocations, level terrain. Negative aspects include distance to state highway/railroad, moderate planning level costs, high potential for wetland and floodplain impacts. High potential for cultural resources issues due to proximity to Galley Rock site.
Blackwell Bottoms (Black) Alternative (RM 183)	4.0/4.3 Miles	Yes	0 feet	824	3	23	17 acres	4,431 feet	100%	High	5.3 miles	0%	$26,624,600	Moderate	Positive aspects include contiguous layout >700 acres, proximity to the navigable channel, low number of relocations, level terrain. Negative aspects include moderate distance to state highway/railroad, moderate planning level costs, high potential for floodplain and cultural/historical resource impacts, distance to existing industry and utilities/infrastructure.
Morrilton (Brown) Alternative (RM 180)	5.3/4.8 Miles	Yes	632 feet	842	5	21	42 acres	9,721 feet	100%	High	4.1 miles	1%	$26,968,000	Moderate	Positive aspects include contiguous layout >700 acres, low number of relocations, level terrain. Negative aspects include distance to state highway/railroad, distance to existing industry, moderate planning level costs, high potential for wetland, stream channel, floodplain and cultural/historical resource impacts. Point Remove Mounds in vicinity. Located near Lock and Dam No. 9.

Note: No reasonable alternatives on south side of Arkansas River due to lack of railroad access. Bridging over Arkansas River is not considered a reasonable option due to the excess cost and additional environmental impacts.

Green Shading = Meets Screening Criteria well compared to the other sites

Yellow Shading = Meets Screening Criteria moderately well compared to the other sites

Tan Shading = Does not meet Screening Criteria as well as green and yellow shaded sites

3.5 PREFERRED ALTERNATIVE - GREEN ALTERNATIVE

The Russellville Bottoms (Green) Alternative has been selected as the preferred alternative for the project. The Green Alternative would consist of an 882-acre tract located near ARM 203 along the left descending bank of the river. A narrow access corridor extends northward to Highway 247. This site generally consists of relatively flat bottomland throughout. Most of this site would be within the floodplain of the Arkansas River. A flood protection levee would be required to protect the Intermodal Facilities from backwater flooding from the Arkansas River and headwater flooding or flash flooding from Whig Creek and its tributaries. Figure 3.2 shows the potential boundary and site layout for the Green Alternative, including the proposed levee.

Positive features of the site include multi-modal access, site layout, site positioned near navigable channel of the Arkansas River, site size, low number of relocations, existing industry close to site, low anticipated impacts to stream channels, existing public utilities/infrastructure close to site, level terrain suitable for development, relatively low planning development costs (~$9,276,000), and low anticipated operations and maintenance costs.

Based upon the 2011-12 Phase II surveys, there are 7 NRHP-eligible archaeological sites located within the Green Alternative. Additional cultural resources Phase II investigations would be required for the 20 archeological sites that have not been evaluated to date. The 20 unevaluated sites would be tested to determine NRHP eligibility in accordance with the approved Programmatic Agreement (PA) that was developed for the FEIS. A copy of the approved PA and associated Work Plan are contained in Appendix C. The unevaluated sites are considered potentially eligible for the NRHP, pending further Phase II testing. The NRHP sites would be protected or mitigated in accordance with the procedures outlined in the approved PA. Such steps would include, but not be limited to, avoiding NRHP-eligible resources through project redesign, minimizing impacts if avoidance is not possible, and mitigating impacts to all NRHP-eligible sites that would be partially or entirely affected by the project, through the implementation of Phase III data recovery efforts.

It is assumed that most of the land within the flood protection levee would be altered as the intermodal facilities are developed. Under the Green Alternative, Whig Creek and one other stream located near the northern boundary of the site would be slightly impacted. However, the high quality wetlands and another small tributary, which would be impacted under the Red Alternative, would be avoided. The lower quality wetlands in the southern portion of the site would be impacted under the Green Alternative. The Green Alternative would have fewer wetland impacts especially in regards to the functional value of wetlands impacted.

Under the Green Alternative, the levee along the Arkansas River boundary of the site would be set back to protect the forested riparian corridor and to provide a buffer between the site and the Arkansas River. These trees would also provide a visual buffer to conceal much of the development on the site from the City of Dardanelle located directly across the river.

As part of the intermodal facilities development, a slackwater harbor would be constructed to provide access from the site to the Arkansas River via barge. The location of the proposed harbor is shown on Figure 3.2. The navigable channel is located close to the left descending riverbank at this location providing easy barge access to the site. A portion of this harbor has already been excavated by a sand and gravel company located near the proposed harbor. Additional excavation and dredging would be required as part of this project to complete the harbor and bring it to appropriate depth and size to support usage for barges.

A railroad connector line would be constructed to provide rail access to the site. The proposed connector line would enter the site from the northwest corner of the site via an extension of the existing short-line Dardanelle-Russellville Railroad. The railroad extension would require construction of a bridge over the lower reaches of Whig Creek.

An access road connecting the intermodal facilities to Highway 247 would be constructed in the northeast corner of the site. This roadway would be a hardened surface to provide a low maintenance facility and to eliminate fugitive dust impacts typically caused by gravel or dirt roads. Highway 247 would provide the main access to and from I-40 and would also provide access to Highway 7.

A network of roadways and railroad spurs would be constructed throughout the intermodal facilities property to provide connections to potential warehouses, industries, and other future users of the facilities as the site is developed. Figure 3.2 shows a general depiction of how these facilities could be placed on the site. The final design of these features will be determined as the intermodal facilities develop.

The Green Alternative was originally developed to avoid some of the potential environmental and social impacts associated with the Red Alternative and to address concerns from resource agencies during the initial public involvement phase of the EIS. The highest quality wetlands located in the Red Alternative project area occur along the Tributary to Whig Creek. These wetlands play an important role in protecting the water quality of Whig Creek, which is listed on the 303d List of Water Quality Limited Waterbodies in Arkansas. The Arkansas Game and Fish Commission expressed concerns over the wetlands that would be impacted by the Red Alternative and desired that they be protected (Leonard pers. comm.). The Green Alternative would avoid these wetlands. In addition, the Green Alternative would have two less residential relocations than the Red Alternative. The Green Alternative would preserve more of the trees along the Arkansas River helping to obstruct the potential visual impacts to the City of Dardanelle.

This site would meet the purpose and need of this project and provide reasonable multi-modal access and suitable development areas. The Green Alternative site is located proximate to existing infrastructure and to existing communities and industries. This site would have minimal impacts to the human environment with six residential relocations.

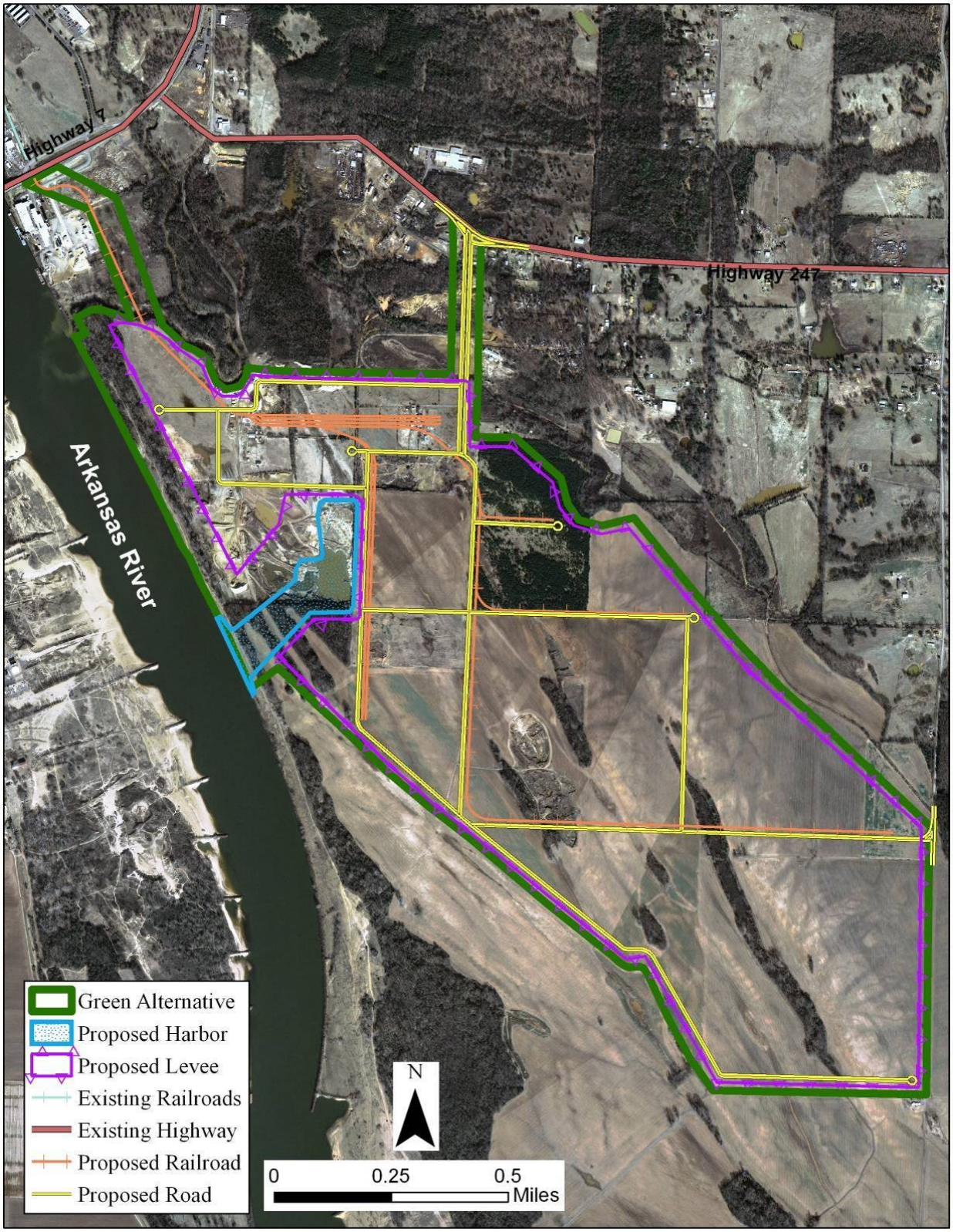
Limiting factors for this site include potential for adverse impacts to wetlands, floodplains, and cultural/historical resources. This site would reduce impacts to most of the streams and wetlands compared to other alternatives in the same general vicinity and using the same river access point. However, at least one stream and some wetlands (17.8 acres) would still be impacted by this alternative. A minor amount of forested land would need to be cleared on this site, however only minor grading and land leveling would be required. A flood protection levee would be required, and this levee would be set back from the left descending bank of the Arkansas River and Whig Creek, which would protect the existing riparian corridor along the river and creek.

Summary of Findings for the Green (Preferred) Alternative

The Green (Preferred) Alternative meets the screening criteria well and is considered a reasonable alternative for project implementation. This alternative was selected as the preferred alternative because:

- The cost of the initial site development would be reasonable when compared to the currently available funds of approximately $7 million;
- The site would provide reasonable multi-modal access, because it is proximal to existing highways, railroads, and the navigation channel of the Arkansas River;
- Approximately 99 percent of the site is suitable for development of ancillary facilities or rail access;
- Relative to some of the other potential alternatives, there would not be severe impacts to the human environment;
- Impacts to the natural resources would be reduced compared to other similar alternatives (i.e., 414 feet of stream channel and 18 acres of wetlands versus up to 9,721 feet of stream channel and 82 acres of wetlands under other alternatives);
- The site is located proximate to existing communities, utilities, infrastructure, and industry;
- The Green Alternative was favored by the resource agencies commenting on the SDEIS; and
- The Green Alternative was favored by the public based upon comments received during the SDEIS public comment period.

Figure 3.2. Conceptual Site Layout of the Preferred Alternative (Green Alternative).



3.6 NO ACTION ALTERNATIVE

The No Action Alternative will result in not pursuing development of intermodal facilities in the six-county ARV region as proposed. The No Action Alternative has no location and no cost. However, there would not be any major improvement in transportation efficiency or enhancement of the region's ability to attract new businesses that prefer or require multi-modal transportation options that would be afforded by the proposed intermodal facilities, including a slackwater harbor for barges, railroad service, and access to intrastate and interstate roadways. Lack of development of the area as a potential employment center could contribute to stagnant population growth in the region. No additional employment, personal income, or tax revenues would be realized under this alternative. Existing environmental impacts from ongoing sand and gravel operations, top-soil removal, and farming would continue. The No Action Alternative has not been selected, because it fails to provide economic development opportunities for the ARV region.

3.7 OTHER ALTERNATIVES EVALUATED IN DETAIL IN THE SDEIS

3.7.1 North Dardanelle (Red) Alternative

The North Dardanelle (Red) Alternative is located near ARM 203 along the left descending bank of the river and extends northward to State Highway 247 and south into the Arkansas River floodplain. This alternative was known as Alternative 3 in the previous November 2002 Intermodal Facilities EA prepared by FHWA. This site generally consists of relatively flat bottomland throughout. Most of this site would be within the floodplain of the Arkansas River. A flood protection levee would be required to protect the Intermodal Facilities from backwater flooding from the Arkansas River and headwater flooding or flash flooding from Whig Creek and its tributaries.

Positive features of the site include multi-modal access, site layout, site positioned near navigable channel of the Arkansas River, site size, low number of anticipated relocations, existing industry close to site, existing public utilities/infrastructure close to site, small percentage of site with steep slopes, and relatively low planning development costs.

This site would meet the purpose and need of this project and provide reasonable multi-modal access and suitable development areas. The rolling terrain in the northeastern portion of the site would not lend itself to noteworthy development, but the remainder of the site is relatively flat and developable. Existing infrastructure, such as primary highways, railroads, and utilities are located proximate to this location. This site is located proximate to several existing communities with diverse populations that could provide an adequate starting workforce for most new industries. This would allow industries to begin production relatively quickly and help to provide immediate benefits to the ARV regional economy.

The Red Alternative met the screening criteria and was considered a reasonable alternative for project implementation addressed in the DEIS and SDEIS. This

alternative was carried forward and fully evaluated in the DEIS and SDEIS, based upon the following factors:

- The cost of the initial site development would be reasonable when compared to the currently available funds of approximately $7 million;
- The site would provide reasonable multi-modal access because it is proximal to existing highways, railroads, and the navigation channel of the Arkansas River;
- Approximately 94 percent of the site is suitable for development of ancillary facilities or rail access;
- Relative to some of the other potential alternatives, there would not be severe impacts to the human environment; and
- The site is located proximate to existing communities, utilities, infrastructure, and industry.

3.7.2 Bend (Purple) Alternative

The Bend (Purple) Alternative site is located near ARM 220 along the north shore of the Arkansas River (Lake Dardanelle) south of Bend and Knoxville, Arkansas. This site consists of an area of rolling terrain, much of which is currently pasture.

The Purple Alternative met most of the screening criteria and was considered a reasonable alternative for project implementation in the SDEIS. This alternative was carried forward and fully evaluated in the SDEIS, based upon the following factors:

- The site provides reasonable multi-modal access for railroad and highway access due to its proximity to existing alignments;
- The site has anticipated minimal adverse impacts to wetlands;
- The site has anticipated minimal adverse impacts to floodplains; and
- There would be low to moderate impacts to the human environment.

Although approximately 63 percent of the site is poorly suited for development of ancillary facilities and rail access due to the steep terrain and physical limitations, it is anticipated that through appropriate engineering design these limitations could be overcome.

3.8 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS IN THE DEIS AND SDEIS.

3.8.1 Pittsburgh Road (Yellow) Alternative

The Pittsburgh Road (Yellow) Alternative site is located near ARM 226 along the left descending bank of the river just south of Cabin Creek and west of Knoxville Junction, Arkansas.

The Yellow Alternative was not reasonable and was not carried forward in the DEIS or SDEIS, based upon the following factors:

- The site would require dredging approximately 5,737 feet of channel to allow access to the Arkansas River Navigation Channel;
- The cost of the initial site development would be approximately 3.8 times more than the currently available funds of approximately $7 million;
- Approximately 87 percent of the site is poorly suitable for development of ancillary facilities or rail access due to the steep terrain and physical limitations;
- There would be severe adverse impacts to wildlife habitat (i.e. the loss of approximately 628 acres of upland forest);
- There would be adverse impacts to perennial and intermittent streams on the site;
- Immediate economic benefits would be moderate to low as approximately 24 industries are located within 15 miles of the site;
- There would be notable impacts to the human environment (i.e. 31 residential relocations); and
- Operations and maintenance costs are expected to be high.

3.8.2 Keener Cove (Blue) Alternative

The Keener Cove (Blue) Alternative site is located near ARM 217.5 along the north shore of the river south of Knoxville, Arkansas. This site consists of an embayment bordered by the UPRR to the east and a Clubb Hill to the west. Clubb Hill rises to approximately 200 feet above the normal elevation of Lake Dardanelle, and the steep terrain would prohibit development. The area north and northwest of the embayment consists of slightly rolling terrain, much of which is currently pasture or part of the City of Knoxville. The area east of the embayment and the railroad is bisected by Highway 64 and slopes upward approximately 60-80 feet for approximately 0.3 miles to I-40. The area between Highway 64 and I-40 would not be conducive to development due to the sloping terrain and the area would not be of sufficient size to accommodate the ancillary facilities. The toe of the railroad bed is often bordering the Keener Cove embayment, and there are several wetlands along the shoreline and between the railroad and Highway 64. Through traffic on Highway 64 [estimated average daily traffic (ADT) of 2,000 vehicles (AHTD, 2006)] and the UP rail line would also have to be maintained. The mainline railroad traffic and the Highway 64 traffic would create a barrier between the potential harbor and the ancillary facilities. This would also be considered a severe safety issue with intermodal vehicle traffic intermingled with Highway 64 traffic and multiple UP railroad crossings.

The Blue Alternative was not reasonable and was not carried forward in the DEIS or SDEIS, based upon the following findings:

- The site would require dredging approximately 7,248 feet of channel to allow access to the Arkansas River Navigation Channel;

- The cost of the initial site development would be approximately 4.5 times more than the currently available funds of approximately $7 million;
- Approximately 35.1 percent of the site is poorly suitable for development of ancillary facilities and rail access due to the steep terrain and physical limitations;
- Recreation activities would be disrupted in the Keener Cove area, both current uses and future uses associated with the potential Highway 64 Cove Park. Since the Blue Alternative will not be carried forward, a Section 4(f) evaluation is not required;
- Opposition to this alternative by the Operations Division of the Little Rock District, USACE;
- There would be substantial adverse impacts to wildlife habitat (i.e. the loss of approximately 105 acres of upland forest and 13.8 acres of wetlands);
- There would be substantial adverse impacts to perennial and intermittent streams on the site (i.e. 7,709 feet);
- Immediate economic benefits would be moderate to low as only approximately 30 industries are located within 15 miles of the site;
- There would be notable impacts to the human environment (i.e. 62 residential relocations); and
- Operations and maintenance costs are expected to be high.

3.8.3 New Hope (Pink) Alternative

The New Hope (Pink) Alternative is located near ARM 203 along the left descending bank of the river and extends along State Highway 247 to New Hope Road in the New Hope community. This alternative was known as Alternative 2 in the previous November 2002 EA for the Intermodal Facilities prepared by FHWA. This site consists of a combination of relatively flat bottomland in the floodplain of the Arkansas River and extends into relatively steep to rolling terrain at the site's northeastern end. A portion of the site would need to be protected by a new levee system.

The Pink Alternative would not be a reasonable alternative and was not carried forward in the DEIS or SDEIS, based upon the following findings:

- Rail access is limited in the northeastern portion of the site;
- There would be significant impacts to the human environment (i.e. 62 residential relocations);
- Based upon previous public comments, residents of the New Hope community are overwhelmingly opposed to this alternative;
- Approximately 27 percent of the site is poorly suitable for development of ancillary facilities due to the rolling terrain and physical limitations;
- There would be substantial adverse impacts to wetland habitat (25.5 acres);

- There would be moderate adverse impacts to perennial and intermittent streams and floodplains on the site;
- There would be high potential for adverse impacts to cultural/historical resources on the site; and
- There are reasonable alternatives in the direct vicinity of the Pink Alternative that do not have significant impacts and are more cost efficient (i.e., Red and Green Alternatives).

3.8.4 Atkins Bottoms (Orange) Alternative

The 820-acre Atkins Bottoms (Orange) Alternative site is located near ARM 188 along the left descending bank of the river south of Atkins, Arkansas. In order to avoid potential impacts to the Galley (Galla) Rock Historical Site, this site was positioned well to the east of Galla Rock. This site consists of primarily flat bottomland, and much of the site is in the floodplain, which would require levee systems to be built to protect the Intermodal Facilities.

The Orange Alternative would not be a reasonable alternative and was not carried forward in the DEIS and SDEIS, based upon the following findings:

- The site would not provide reasonable multi-modal access primarily due to its distance from existing highways and railroads;
- The cost of the initial site development from dredging, delivery of utilities, and construction of access railway and access roadway would be approximately 4.4 times more than the currently available funds of approximately $7 million;
- There would be approximately 98 acres of bottomland hardwood forest cleared;
- There would be substantial adverse impacts to wetland habitat (82 acres);
- There would be adverse impacts to perennial and intermittent streams and floodplain on the site; and
- There would be a high potential for adverse impacts to cultural resources.

3.8.5 Blackwell Bottoms (Black) Alternative

The 824-acre Blackwell Bottoms (Black) Alternative site is located near ARM 183 along the left descending bank of the river south of Blackwell and Kenwood, Arkansas. The entire site would be located in the floodplain, which would require additional levee systems to be built to protect the Intermodal Facilities.

The Black Alternative was not a reasonable alternative and was not carried forward in the DEIS and SDEIS, based upon the following findings:

- The site would not provide reasonable multi-modal access primarily due its distance from existing highways and railroads;

- The cost of the initial site development from dredging, delivery of utilities, and construction of access railway and access roadway would be approximately 4.0 times more than the currently available funds of approximately $7 million;
- Immediate economic benefits would be low as only approximately 23 industries are located within 15 miles of the site;
- There would be adverse impacts to floodplain on the site; and
- There would be a high potential for adverse impacts to cultural resources.

3.8.6 Morrilton (Brown) Alternative

The 842-acre Morrilton (Brown) Alternative site is located near ARM 180 along the left descending bank of the river southwest of Morrilton, Arkansas. The position of Lock and Dam No. 9 prohibits positioning the site farther north or closer to the City of Morrilton. The entire site would be located in the floodplain, which would require additional levee systems to be built to protect the Intermodal Facilities from backwater flooding from the Arkansas River and headwater flooding from Point Remove Creek.

The Brown Alternative would not be a reasonable alternative and was not carried forward in the DEIS and SDEIS, based upon the following findings:

- The site would not provide reasonable multi-modal access primarily due to its distance from existing highways and railroads;
- The cost of the initial site development from dredging, delivery of utilities, and construction of access railway and access roadway would be approximately 4.0 times more than the currently available funds of approximately $7 million;
- The site would impact 380 acres of bottomland forest;
- There would be adverse impacts to floodplains on the site;
- The site access improvement and site development would adversely impact 42 acres of wetlands and Point Remove Creek;
- The site would have long-term operational and maintenance deficiencies, because it is positioned on an inside bend of the Arkansas River;
- Immediate economic benefits would be low as only approximately 21 industries are located within 15 miles of the site; and
- There would be a high potential for adverse impacts to cultural resources due to the juxtaposition with Point Remove Mounds.